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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,041	08/09/2001	Alexander C. Loui	82600DMW	4725

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EXAMINER
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HANNE, SARA M

ART UNIT	PAPER NUMBER
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2179

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/927,041	<b>Applicant(s)</b> LOUI ET AL.	
	<b>Examiner</b> Sara M Hanne	<b>Art Unit</b> 2179	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 24 August 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This action is responsive to the amendment received on August 24, 2004.  
Amended Claims 7, 10, 17 and 20, New claims 21-22 and originally presented claims 1-6, 8-9, 11-16 and 18-19 are pending in the application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-2, 4-7 are rejected under 35 U.S.C. 102(a) as being anticipated by Qian et al., US Patent 6721454.

As in Claims 1 and 10, Qian et al. teaches a method and computer storage medium with instructions for obtaining unstructured video frames ("A video sequence 2 is input", Column 2, lines 64-65), generating segments from the shot boundaries based on the color dissimilarity between consecutive frames ("A color histogram technique may be used to detect the boundaries of the shots", Column 3, lines 42-43), extracting a set by processing pairs of segments ("the global motion of the video content is estimated 8 for each pair of frames in a shot", Column 3, lines 59-61) for their visual dissimilarity and temporal relationship, and merging the video segments by applying a probabilistic analysis to the extracted set to represent the video structure ("each shot is

summarized 16 ... events 22 are inferred from the shot summaries by a domain specific event inference model". Column 3, lines 6-8).

As in Claim 2, Qian et al. teaches generating color histograms from the consecutive frames and from the histograms, generating a difference signal, thresholding of this signal based on a mean dissimilarity over several frames to produce a signal representative of the existence of a shot boundary (Column 3, lines 42-50 and Figure 5).

As in Claim 4, Qian et al. teaches morphologically transforming the thresholded difference signal with a pair of structuring elements to eliminate the presence of multiple adjacent shot boundaries ("When the difference between the histograms of two frames exceeds a predefined threshold, the content of the two frames is assumed to be sufficiently different", Column 3, lines 45-48).

As in Claim 5, Qian et al. teaches computing a mean color histogram for each segment and a visual dissimilarity feature metric from the difference between mean color histograms for pairs of segments (Column 3, lines 42-50 and Figure 5).

As in Claim 6, Qian et al. teaches processing pairs of segments for a temporal separation between pairs of segments and for an accumulated temporal duration between pairs of segments ("each shot is summarized 16 ... events 22 are inferred from the shot summaries by a domain specific event inference model". Column 3, lines 6-8).

As in Claim 7, Qian et al. teaches generating parametric mixture models (summaries created by shot summarization 16, Figure 1) to represent class-conditional densities of inter-segment features (based on temporal information and color analysis,

See Claim 1 rejection *supra*) of the feature set and applying the merging criterion to the parametric mixture models (event inference 20/detected events 22, Figure 1).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al., US Patent 6721454.

Qian et al. teaches obtaining unstructured video frames, generating segments from the shot boundaries based on the color dissimilarity between consecutive frames, extracting a set by processing pairs of segments for their visual dissimilarity and temporal relationship by generating color histograms from the consecutive frames and from the histograms, generating a difference signal, thresholding of this signal based on a mean dissimilarity over several frames to produce a signal representative of the existence of a shot boundary (See Claim 2 rejection *supra*) and merging the video segments by applying a probabilistic analysis to the extracted set to represent the video structure (See Claim 1 rejection *supra*) and the difference signal to be based on a mean dissimilarity over several frames centered on one frame. Qian et al. fails to teach basing the number of frames used to calculate the difference signal on a fraction of the frame rate of video capture as recited in the claims. Within the field of the invention, it

would be obvious to one of ordinary skill in the art to base the number of frames on a fraction of the frame rate (See also Image Analysis and Mathematic Morphology, Vol. 1, Jean Serra). One would have been motivated to make such a combination because a shortened time frame for calculating the difference signal would have been obtained.

6. Claim 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al., US Patent 6721454.

In accordance with Claims 8 and 15, it is notoriously well known that queues are used to implement hierarchical displays. The examiner takes official notice of this teaching. It would be obvious to one of ordinary skill in the art to combine the use of the organizing video segments into hierarchies with a queue implementation.

7. Claims 9, 11-15 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al., US Patent 6721454 and further in view of Qian et al., US Patent 6616529.

As in Claims 9, 11, 17-18 and 20, US Patent 6721454 teaches a method and computer storage medium with instructions for obtaining unstructured video frames ("A video sequence 2 is input", Column 2, lines 64-65), generating segments from the shot boundaries based on the color dissimilarity between consecutive frames ("A color histogram technique may be used to detect the boundaries of the shots", Column 3, lines 42-43), extracting a set by processing pairs of segments ("the global motion of the video content is estimated 8 for each pair of frames in a shot", Column 3, lines 59-61)

for their visual dissimilarity and temporal relationship, merging adjacent video segments by applying a probabilistic analysis to the extracted set to represent the video structure ("each shot is summarized 16 ... events 22 are inferred from the shot summaries by a domain specific event inference model". Column 3, lines 6-8), and generating a parametric mixture model of the inter-segment features ("In this model inference module, a hunt event is inferred after detecting three shots containing hunt candidates", Column 11, lines 60-62). While US Patent 6721454 teaches the segmentation due to color dissimilarity, extraction due to visual dissimilarity and temporal relationships, merging with probabilistic analysis and generation of a parametric mixture model, they fail to show the probabilistic analysis to be a Bayesian analysis applied to the parametric mixture model, and representing the merging sequence in a hierarchical tree structure as recited in the claims. US Patent 6616529 teaches a video segmentation method similar to that of US Patent 6721454. In addition, US Patent 6616529 further teaches the probabilistic analysis to be a Bayesian analysis applied to the parametric mixture model (Figure 3 and corresponding text in Columns 4-5), and representing the merging sequence in a hierarchical tree structure (Figures 2a-2g and corresponding text). It would have been obvious to one of ordinary skill in the art, having the teachings of US Patent 6721454 and US Patent 6616529 before him at the time the invention was made, to modify the segmentation with color dissimilarity and temporal relationships with a parametric mixture model taught by US Patent 6721454 to include the construction of hierarchy according to probabilistic merging with Bayesian analysis of US Patent 6616529, in order to obtain a hierarchical representation of the frames

grouped by color dissimilarity and temporal relationships according to Bayesian probability methods of analysis. One would have been motivated to make such a combination because a visual representation of the segmented video would have been obtained, as taught by US Patent 6616529 (Column 2, lines 24-55).

As in Claim 12, US Patent 6721454 teaches computing a mean color histogram for each segment and a visual dissimilarity feature metric from the difference between mean color histograms for pairs of segments (See Claim 5 rejection *supra*).

As in Claim 13, US Patent 6721454 teaches processing pairs of segments for a temporal separation between pairs of segments and for an accumulated temporal duration between pairs of segments (See Claim 6 rejection *supra*).

As in Claim 14, US Patent 6721454 teaches generating parametric mixture models to represent class-conditional densities of the inter-segment features that comprise the feature set (See Claim 7 rejection *supra*).

As in Claim 15, US Patent 6721454 teaches performing the merging in a hierarchical queue by initializing the queue by introducing each feature in the queue with a priority of the probability of merging each corresponding pair of segments, depleting the queue by merging the segments if the criterion is met, and updating the queue based on the updated model (See Claim 8 rejection *supra*).

As in Claim 16, US Patent 6721454 teaches representing the merging sequence as a hierarchical tree structure (See Claim 9 rejection *supra*) including a frame extracted from each segment and displayed at each node of the tree (Column 10, line 61 – Column 11, line 6).



As in Claim 19, US Patent 6721454 teaches representing the merging sequence as a hierarchical tree structure including a frame extracted from each segment and displayed at each node of the tree (See Claim 16 rejection supra).

As in Claim 21, US Patent 6721454 teaches a method and for generating video segments from the unstructured video frames ("A video sequence 2 is input", Column 2, lines 64-65), by detecting shot boundaries based on the color dissimilarity between consecutive frames ("A color histogram technique may be used to detect the boundaries of the shots", Column 3, lines 42-43), extracting a feature set by processing pairs of segments ("the global motion of the video content is estimated 8 for each pair of frames in a shot", Column 3, lines 59-61) for their visual dissimilarity and temporal relationship, merging adjacent video segments by applying a probabilistic analysis to the feature set to represent the video structure independent of any empirical parameter determination ("each shot is summarized 16 ... events 22 are inferred from the shot summaries by a domain specific event inference model". Column 3, lines 6-8). While US Patent 6721454 teaches the segmentation due to color dissimilarity, extraction due to visual dissimilarity and temporal relationships, merging with probabilistic analysis and generation of a parametric mixture model, they fail to show generating a hierarchy having a merging sequence represented by a binary partition tree as recited in the claims. US Patent 6616529 teaches a video segmentation method similar to that of US Patent 6721454. In addition, US Patent 6616529 further teaches generating a hierarchy having a merging sequence represented by a binary partition tree (Figures 2a-2g and corresponding text). It would have been obvious to one of ordinary skill in the art,

having the teachings of US Patent 6721454 and US Patent 6616529 before him at the time the invention was made, to modify the segmentation with color dissimilarity and temporal relationships with a parametric mixture model taught by US Patent 6721454 to include the construction of hierarchy having a merging sequence represented by a binary partition tree of US Patent 6616529, in order to obtain a hierarchical representation of the frames grouped by color dissimilarity and temporal relationships. One would have been motivated to make such a combination because an organized visual representation of the segmented video would have been obtained, as taught by US Patent 6616529 (Column 2, lines 24-55).

As in Claim 22, US Patent 6616529 teaches maximizing the a posteriori probability mass function of a binary random variable that represents inter-segment features of the video segments (Figures 2a-2g and Column 2, lines 45, et seq.).

### ***Response to Arguments***

Applicant's arguments filed 8/24/04 have been fully considered but they are not persuasive.

In response to the argument that Qian fails to teach "obtaining unstructured video frames" the examiner disagrees. In the beginning of the process, the boundaries frames are undetected, therefore when the process begins the frames are unstructured.

In response to the argument that Qian fails to teach "extracting a set by processing pairs of segments for their visual dissimilarity and temporal relationship and merging the video segments by applying a probabilistic analysis to the extracted set",

Art Unit: 2179

the examiner disagrees. The process of "inserting" merges frames together, constituting a pair of segments that define the event.

In response to the arguments regarding claim 4, Qian does teach detection of shot boundaries admitted by the applicant on page 9, line 29.

In response to the arguments regarding claim 3, Within the field of the invention, it would be obvious to one of ordinary skill in the art to base the number of frames on a fraction of the frame rate (See above). One would have been motivated to make such a combination because a shortened or lengthened (dependent upon the value of the fraction) time frame for calculating the difference signal would have been obtained.

In response to the arguments regarding claim 8, see merging argument *supra*.

In response to the arguments regarding "applying Bayesian analysis to a parametric mixture model of inter-segment features", the examiner responds as such: US Patent 6721454 teaches a parametric mixture model of the inter-segment features as seen above, therefore the inter-segment features are shown. US Patent 6616529 is relied upon primarily to teach the probabilistic analysis to be a Bayesian analysis and not for the inter-segment features limitation as that it is already disclosed by the primary reference.

***Conclusion***

The prior art made of record on form PTO-892 and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111(c) to consider these references fully when responding to this action. The documents cited therein teach similar video segment merging techniques.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sara M Hanne whose telephone number is (571) 272-4135. The examiner can normally be reached on M-F 7:30am-4:00pm, off on alternating Fridays.

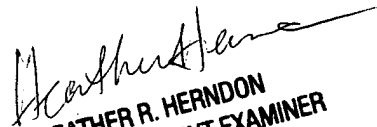
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Heather R Herndon can be reached on (571) 272-4136. The fax phone

Art Unit: 2179

number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

smh

  
HEATHER R. HERNDON  
SUPERVISORY PATENT EXAMINER  
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